Investigating the anti-cancer effects of novel quinoxaline derivatives on breast and cervical cancer cells

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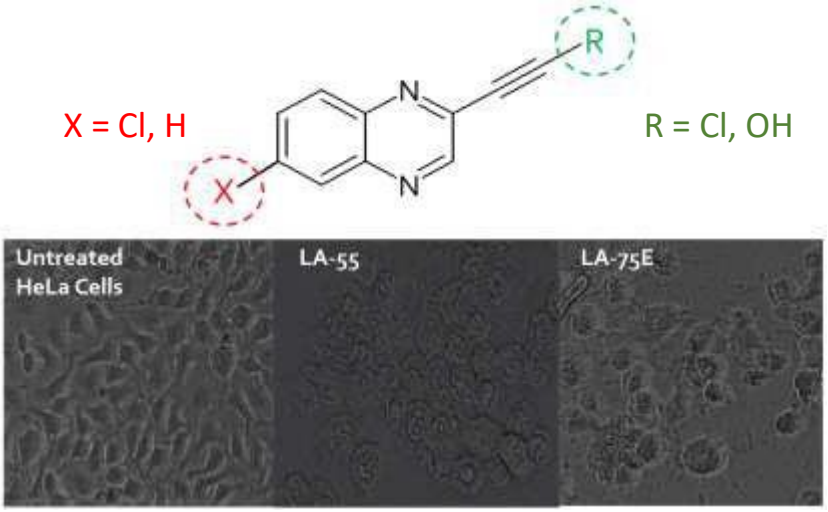

Fig 1: Quinoxaline derivatives, LA-55 and LA-75E, selectively inhibit HeLa cells viability.

Introduction: Quinoxaline derivatives are pharmacologically important heterocyclic compounds which possess a variety of beneficial biological activities such as antimicrobial, anti-tumour and anti-inflammatory effects (Kaushal *et al*., 2019). The aim of this study was to investigate the anti- cancer effects of quinoxaline derivatives on HeLa and T47D cancer cells.

Methodology: The absorption spectrum of quinoxaline derivatives was determined at different wavelengths. The antioxidant activity was analysed using the DPPH free radical scavenging activity and the ferric reducing power assay. The cytotoxic and proliferation inhibitory effects of quinoxaline derivatives were evaluated using the MTT cell viability assay and PI/DAPI staining, respectively.

Results: Spectral absorbance of 3-(quinoxalin-3-yl)prop-2-yn-1-ol (LA-55) and 3-(6-chloroquinoxaline-2- yl)prop-2-yn-1-ol (LA-155A) showed multiple peaks while 2-(3-chloroprop-1-ynyl)quinoxaline (LA- 75E) displayed a single broad peak at 275 nm and 400 nm as a result of aromatic rings. The DPPH antioxidant assay showed that the scavenging activity of LA-55 increased with an increase in concentration, while that of LA-75E and LA-155A displayed no notable free radical scavenging activities. Cell viability studies showed that LA-75E and LA-155A displayed the most cytotoxic effects on HeLa cells at 100 µM. Morphological studies revealed the presence of cell shrinkage and cell membrane blebbing.

Discussion and conclusion: Results from DAPI fluorescence analysis portray that LA-55 and LA-155A inhibit cell proliferation significantly. The result obtained show that the LA-55, LA-55A and LA-75E quinoxaline derivatives are capable of inducing cell death in HeLa and T47D cancer cells.

References: Ajani, O.O., Nlebemuo, M.T, Adekoya, J.A., Ogunniran, K.O., Siyanbola, T.O. and Ajanaku, CO.O. 2019. Chemistry and pharmaceutical diversity of quinoxaline motifs as anticancer agents. Acta Pharmaceutical. 69:177-196.

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